



**MATERIAL SAFETY DATA SHEET**

**SECTION 1 — PRODUCT IDENTIFICATION**

**Product identifier:** KEVLAR-CARBON  
**Product code:** not available.  
**Product use:** Reinforcements for various resin systems.

**Supplier / Manufacturer name and address:**

Saint-Gobain BTI  
43 Bibber Parkway  
Brunswick, Maine 0401  
Phone #: 1-888-284-2667

**Emergency Telephone #:** not available.

**SECTION 2 — CHEMICAL COMPOSITION/HAZARDOUS INGREDIENTS**

<u>Ingredients</u>	<u>CAS #</u>	<u>% (weight)</u>	<u>OSHA PEL</u>	<u>ACGIH TLV</u>
Carbon, continuous filament	7440-44-0	10-98*	not available	not available
Kevlar, continuous filament	not available	10-98*	not available	not available
Organic polymer solids (cured)	not available	1-2	not available	not available

\* - the concentration of ingredients 1 and 2 varies with each style

**SECTION 3 — HAZARDS IDENTIFICATION**

**\*\*\*POTENTIAL HEALTH EFFECTS\*\*\***

**Primary route (s) of entry:** As shipped, KEVLAR aramid fiber products do not pose a hazard. KEVLAR staple and pulp contain a small amount of respirable fibers which may become airborne during opening, mixing, carding, or regrinding waste products containing KEVLAR. Repeated and prolonged inhalation of excessive concentrations of respirable fibers may cause permanent lung injury.

**Signs and symptoms of short-term (acute) exposure:**

*Inhalation:* Overexposure to the respirable fibers by inhalation may cause mild and temporary upper respiratory irritation with discomfort and cough. Based on animal testing, prolonged and repeated exposure to excessive concentrations of respirable fibers may cause permanent lung injury.

*Skin contact:* Skin sensitization has not been observed in human skin tests. The mechanical action of the fibers may cause slight skin irritation.

*Eye contact:* The mechanical action of the fibers may cause mild irritation.

*Ingestion:* By ingestion, the KEVLAR has very low acute oral toxicity with no deaths observed in animal feeding studies at dose levels up to the maximum, 7500 mg per kg Oral ALD: in excess of 7500 mg per kg in rats.

**Effects of long-term (chronic) exposure:** A two-year animal inhalation study (1985) with KEVLAR pulp (refined to increase its respirable fiber content) showed mild fibrosis at concentrations of 25 fibers per cubic centimetre and lung tumors (cystic keratinizing squamous cell carcinomas) in some rats in the group exposed to respirable fibers at concentrations of 100 fibers per cubic centimetre. This is a unique type of tumor not found in humans and may be indicative of a non-specific biological response to the respirable material rather than an indication of KEVLAR toxicity. No lung tumors and no fibrosis were seen in animals exposed to 2.5 respirable fibers per cubic centimetre for two years. At no concentrations were fibers found to have migrated beyond the lungs and associated lymph system. Abdominal cavity tumors have been observed in two studies where rats were administered KEVLAR by intercavity injection.

**Other important hazards:** None reported.

#### SECTION 4 — FIRST AID MEASURES

**Inhalation:** If large amounts of fibers are inhaled, remove to fresh air. If breathing is difficult, give oxygen, and call a physician.

**Skin contact:** If fibers irritate the skin, wash with soap and water.

**Eye contact:** Flush eyes with plenty of water. Get medical attention if irritation persists.

**Ingestion:** If swallowed, get medical attention. Unlikely route of entry.

#### SECTION 5 — FIRE FIGHTING MEASURES

**Fire hazards and conditions of flammability:** KEVLAR fiber is inherently flame resistant but can be ignited (limiting oxygen index – 29); burning normally stops when the ignition source is removed. Pulp or dust accumulations may continue to smolder if once ignited. Dust of KEVLAR does not present an explosion hazard. Carbon fibers are electronically conductive and may cause short-circuits which results in damage to or malfunctioning electrical equipment. All forms of electrical equipment, enclosures, and circuits in or near areas where fibers are used or handled should be properly protected against the infiltration of or contact with airborne particles or filaments.

**Flash point (Method):** not available

**Lower flammable limit (% by volume):** not available

**Upper flammable limit (% by volume):** not available

**Explosion data:** not available

*Sensitivity to mechanical impact:* None.

*Sensitivity to static discharge:* None.

**Oxidizing properties:** None.

**Auto-ignition temperature:** None.

**Suitable extinguishing media:** Water, chemical foam, dry chemical, CO<sub>2</sub>.

**Special fire-fighting procedures and equipment:** Wear self-contained breathing apparatus.

**Hazardous combustion products:** Burning KEVLAR produces combustion gases similar to those from wool – mostly carbon dioxide, water and oxides of nitrogen; however carbon monoxide, small amounts of hydrogen cyanide and various other toxic gases are produced, depending on conditions of burning.

#### SECTION 6 — ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Use appropriate personal protective equipment during clean up.

**Environmental precautions:** Dispose in accordance with government regulations. Keep debris minimal by locating waste disposal equipment near work area.

**Spill, Response and Cleanup:** Wash, shovel or sweep up and place in solid waste containers. Clean up dusts and fibers with high efficiency particulate air (HEPA) filtered vacuum equipment.

**Prohibited materials:** No data.

#### SECTION 7 — HANDLING AND STORAGE

**Safe handling procedures:** Avoid breathing fibers of dust. Follow good industrial hygiene practices for ventilation and clean-up; in particular avoid the use of air jets to blow off equipment; use vacuum cleaners with high efficiency particulate air (HEPA) filters instead.

**Storage requirements:** KEVLAR dry pulp should be stored with 4-8% absorbed moisture to control static charge.

**Incompatible materials:** None known.

**Special packaging materials:** No data.

## SECTION 8 — EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Ventilation and engineering controls:** Where technically feasible, use engineering controls, such as isolation, enclosures, exhaust ventilation, wetting, and dust collection systems wherever necessary to control airborne respirable fiber exposures below applicable limits.

**Respiratory protection:** When cutting or mechanically working this product, wear NIOSH- approved respiratory protection if there is potential for airborne exposures in excess of applicable limits, or if there is potential for irritation of nasal passages to occur due to the mechanical action of the fibers.

**Protective gloves:** Recommended.

**Eye protection:** Safety glasses or coverall goggles.

**Other protective equipment:** Loose fitting clothing that is routinely washed is recommended to reduce build up of fibers at chafing points. Laser cutting of fabric of KEVLAR or of laminated containing KEVLAR or machining that produces smoke should be well exhausted or ventilated to remove fumes from the workplace.

**Permissible exposure levels:** ACGIH and OSHA - not established for respirable fibers or dust.

OSHA has a limit of 15 mg per m<sup>3</sup> total dust and 5 mg per m<sup>3</sup> respirable dust for Particulates not otherwise regulated.

Du Pont has established a limit of 2 respirable fibers per cc for KEVLAR respirable fibers, and 5 mg per m<sup>3</sup> total dust for KEVLAR dust.

Currently no health standards exist for employee exposure to carbon fibers. In 1977 NIOSH proposed that their recommended standard for fibrous glass be applied to other man-made fibers. NIOSH recommends an exposure limit of 3.0 fibers per cc for fibers less than 3.5 microns in diameter and length greater than 10 microns.

## SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

**Physical form, color and odor:** Black and yellow fibers assembled into fabric of varying weights and thickness. No odor.

**Odor threshold:** None.

**pH:** Not determined.

**Boiling point:** Not determined.

**Melting and freezing point:** KEVLAR: Does not melt. Carbon: 3600°Celsius (6512°Fahrenheit)

**Vapour pressure:** Does not have vapour pressure.

**Solubility in water:** Insoluble.

**Coefficient of oil/water distribution:** None.

**Specific gravity or relative density (water = 1):** KEVLAR: 1.44 Carbon: 1.7-2.0

**Vapour density:** Not determined.

**Volatile organic compounds (VOC's):** Not volatile.

**Evaporation rate:** not applicable

## SECTION 10 — REACTIVITY AND STABILITY DATA

**Stability and reactivity:** Stable at normal temperature and storage conditions. Polymerization will not occur.

**Conditions to avoid:** None known.

**Materials to avoid:** None reasonably foreseeable.

**Hazardous decomposition products:** KEVLAR begins to decompose at about 400°C (800°F), in air by oxidation. Heat generated by laser cutting of fabric or laminates generates a variety of toxic off-gasses, some of which may cause irritation of the respiratory tract.

## SECTION 11 — TOXICOLOGICAL INFORMATION

**LD<sub>50</sub>:** not available. By ingestion, the KEVLAR fiber has very low acute oral toxicity with no deaths observed in animal feeding studies at dose levels up to the maximum, 7500 mg per kg Oral ALD: > 7500 mg per kg in rats.

**LC<sub>50</sub>:** not available

**Routes of exposure:** Inhalation, eye and skin contact.

**Other toxicity data:**

**Toxicological data:** Carbon: Specific toxicity tests have not been conducted on this product. The evaluation is based on information from similar products, technical literature and professional experience. Dense dust generated by the handling and, or processing of this material may be irritating to the eyes, skin, nose and throat. Studies indicate that airborne carbon fibers, in general, are not considered respirable. A typical carbon fiber may be characterized as having a large diameter (5 to 7 microns) in addition to great length (in excess of 100 microns). Fibers with diameters in excess of 3.5 microns are not considered respirable

**Carcinogenicity:** No component of this product is listed as a carcinogen by the NTP, OSAH, or IARC.

**Teratogenicity, mutagenicity, other reproductive effects:** No adequate data to classify.

**Sensitization to material:** No data.

**Conditions aggravated by exposure:** None known.

**Synergistic materials:** None known.

## SECTION 12 — ECOLOGICAL INFORMATION

**Important environmental characteristics:** Ecological testing has not been conducted on this product.

**Aquatic toxicity:** No data.

## SECTION 13 — WASTE DISPOSAL

**Handling for disposal:** Not a hazardous waste.

## SECTION 14 — TRANSPORTATION INFORMATION

**Transportation of Dangerous Goods (TDG) information:**

*Shipping description:* Not regulated.

**49 CFR information:**

*Shipping description:* Not regulated.

**International Dangerous Goods information:**

*IMO:* Not regulated.

*ICAO:* Not regulated.

**Other information:** None.

## SECTION 15 — REGULATORY INFORMATION

**WHMIS information:** Exempt.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and this MSDS contains all the information required by the CPR.

**CEPA information:** Exempt.

**TSCA information:** Exempt

## SECTION 16 — OTHER INFORMATION

**Prepared by:** Saint-Gobain BTI

**Telephone number:** (207) 729-7792

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